

U.S. Patent Application Serial No. **09/806,485**
Amendment filed August 2, 2005
Reply to OA dated April 4, 2005

REMARKS

Claims 1-12 are pending in this application. An amendment is proposed amending claim 9. Upon entry of this amendment, claims 1-12 will be pending. Applicant respectfully submits that no new matter is added by this Amendment. It is believed that this Amendment is fully responsive to the Office Action dated **April 4, 2005**.

Applicant respectfully notes that the Office action summary indicates that claims 1-13 are pending in the application. However, Applicant believes that only claims 1-12 have been pending and are currently pending in this application.

In the proposed amendment, the limitation "at the rate of 0.01 to 10.0 parts by weight per minute for 100 parts by weight of the polymerizable prepolymer" is inserted into claim 9. This amendment is supported by the disclosure on page 55, lines 12-17, of the specification.

Regarding paragraph no. 4 of the Office action.

In paragraph no. 4 of the Office action, the Examiner indicates that the Terminal Disclaimer over US 6,583,208, filed in the last amendment, has been accepted. However, the Examiner indicates that Applicant also needs to state common ownership at the time of the present invention, citing MPEP 706.02(1)(2).

However, Applicant's understanding is that the statement referred to by the Examiner is relevant only for rejections under 35 U.S.C. 103(a) for prior art under 35 U.S.C. 102(e), (f) or (g), when 35 U.S.C. 103(c) is applicable. In Applicant's understanding, Suzuki US 6,583,208 has a U.S.

U.S. Patent Application Serial No. **09/806,485**
Amendment filed August 2, 2005
Reply to OA dated April 4, 2005

filing date of April 27, 2000, and is **not prior art under 35 U.S.C. 102(e), (f) or (g)**. In addition, the PCT application for Suzuki cannot be prior art under 35 U.S.C. 102(e) because it was filed before the November 29, 2000, effective date of the current version of 35 U.S.C. 102(e).

Applicant telephoned Examiner Ronesi on April 25, 2005, regarding this issue, and she said that she was expecting Applicant to deal with the possible issue of prior art under 35 U.S.C. 102(e), (f) and (g) in paragraph no. 7 of the last Office action, raised again in paragraph no. 9 of the present Office action. This issue is discussed below in regard to paragraph no. 9.

Claims 1-12 are rejected under 35 U.S.C. §102(b) as being anticipated by Suzuki et al. (WO 97/43343). (Office action paragraph no. 7)

The rejection of claims 1-8, 11 and 12, is respectfully traversed. The rejection of claims 9-10 is overcome by the amendment to claim 9.

In the Amendment dated January 27, 2005, Applicant argued that Suzuki et al. WO'343 did not disclose the limitations recited as clauses (i) to (iii) of claim 1, and that these limitations were not inherent in the reference. However, the Examiner now states that "these are only conclusory statements where no evidence has been provided."

Applicant therefore here supplements Applicant's previous argument by the submission of a Declaration under 37 CFR 1.132, by Noriyuki SUZUKI, attached to this Response. The Declaration by Mr. Suzuki demonstrates that a composition prepared according to the method of WO 97/43343, has **none** of the rheologic properties recited as limitations (i)-(iii) in claim 1. The

U.S. Patent Application Serial No. 09/806,485
Amendment filed August 2, 2005
Reply to OA dated April 4, 2005

composition of claims 1-8, 11 and 12, is therefore **not anticipated** by WO 97/43343.

Moreover, regarding claims 9-10, claim 9 has been amended to limit the step of “adding the clay dispersion continuously or sequentially over time at the rate of 0.01 to 10.0 parts by weight per minute for 100 parts by weight of the polymerizable prepolymer ...” By contrast, the cited reference, WO 97/43343, which corresponds to US 6,239,195, describes that “The monomer can then be added to the dispersion and sufficiently agitated to obtain a mixture” (page 23, lines 8-9, of WO 97/43343; column 14, lines 63-64, of US Patent No. 6,239,195). That is, WO 97/43343 clearly describes that **the monomer should be added to the dispersion.**

That is, from the viewpoint of the monomer, WO 97/43343 describes that a very large amount of the dispersion is added to a very small amount of the monomer at once. WO 97/43343 does **not** describe the method of “adding the clay dispersion to a polymerizable prepolymer continuously or sequentially over time at the rate of 0.01 to 10.0 parts by weight per minute for 100 parts by weight of the polymerizable prepolymer”. Claims 9-10 are therefore **not anticipated** by WO ‘343.

Moreover, in the method of WO 97/43343, a sufficient interaction between the dispersion and the prepolymer is not achieved, and the aforementioned rheologic properties (i)-(iii) **cannot be achieved**. Since the composition obtained by the method of WO 97/44343 cannot achieve the aforementioned rheologic properties (i)-(iii), the composition of WO 97/43343 cannot achieve the effects on the improvement in mechanical properties, heat resistance and dimensional stability, as

U.S. Patent Application Serial No. 09/806,485
Amendment filed August 2, 2005
Reply to OA dated April 4, 2005

well as the effects on the improvement of molding conditions such as cooling time and mold temperature, and improvement in releasability and molding cycle, of the present invention. Since the present invention has the aforementioned rheologic property, the effects on the improvement in mechanical properties, heat resistance and dimensional stability are efficiently achieved without damaging surface quality. The effects on the improvement of molding conditions such as cooling time and mold temperature, and improvement in releasability and molding cycle are described at page 129, lines 9-19, of the present specification. That is, there is no suggestion in WO '343 for the compositional or method limitations of the present claims.

Applicant therefore submits that claims 1-12 are not anticipated by, and are non-obvious over, Suzuki et al. WO 97/43343.

Claims 9 and 10 are rejected under 35 U.S.C. §103(a) as being unpatentable over Suzuki et al. (WO 97/43343) in view of Maeda et al. (JP 09-328538). (Office action paragraph no. 8)

Reconsideration of the rejection is respectfully requested in view of the proposed amendment to claim 9. As noted above, claim 9 has been amended to specifically recite a range for the rate of addition of the clay dispersion to the polymerizable prepolymer, and Applicant has noted above that the recitation of claim 9 is not anticipated by and non-obvious over Suzuki et al. WO '343, taken alone.

Maeda et al. (JP 9-328538) discloses a method of manufacturing polyester containing

microparticles. Specifically, claim 1 of Maeda et al. describes a method comprising the steps of: delivering a slurry continuously to an esterification reaction chamber; and performing an esterifying reaction. Paragraph [0021] of Maeda et al. describes that: (1) ethylene glycol was added to an aqueous dispersion containing colloidal silica; (2) a terephthalic acid was added thereto so that a slurry was prepared; (3) the slurry was continuously delivered to an esterifying chamber; and (4) an esterifying reaction was performed.

That is, Maeda et al. describes that prepolymers are added to silica dispersion, thereby a slurry is prepared, and the prepared slurry is continuously delivered to an esterifying chamber and an esterifying reaction is performed.

It should be noted that the “supplying continuously” step described in Maeda et al. paragraphs [0006] and [0007], which was referred to by the Examiner in the Office Action, is performed **after** the slurry containing prepolymers is prepared. The “supplying continuously” step of the reference is **not** a step of adding dispersion to a polymerizable prepolymer, as recited in claim 9.

Maeda et al. does not describe or suggest that the dispersion is added to the prepolymers. Maeda et al. does not describe or suggest a method of “adding the clay dispersion to a polymerizable prepolymer continuously or sequentially over time at the rate of 0.01 to 10.0 parts by weight per minute for 100 parts by weight of the polymerizable prepolymer”.

As described above, Suzuki et al. (WO 97/43343) and Maeda et al. fail to describe or suggest a method of “adding the clay dispersion to a polymerizable prepolymer continuously or sequentially

U.S. Patent Application Serial No. **09/806,485**
Amendment filed August 2, 2005
Reply to OA dated April 4, 2005

over time”. Applicant submits that there is no motivation for those skilled in the art to select a very slow rate of adding the dispersion to the prepolymer. Applicant therefore submits that there is no suggestion or motivation in either WO 97/43343 and Maeda et al. for the limitation of claim 9 of “adding the clay dispersion to a polymerizable prepolymer continuously or sequentially over time at the rate of 0.01 to 10.0 parts by weight per minute for 100 parts by weight of the polymerizable prepolymer”.

Therefore, claims 9 and 10 are not obvious over WO 97/43343 and Maeda et al, taken separately or in combination.

Claims 1 and 4-8 are directed to an invention not patentably distinct from claims 1-4 of commonly assigned U.S. Patent no. 6,583,208 B1. (Office action paragraph no. 9)

Applicant respectfully submits that the rejection for obviousness-type double patenting over US 6,583,208 B1 was obviated by the filing of a terminal disclaimer over US 6,583,208 B1 concurrently with the Amendment dated January 27, 2005. The Examiner indicates in paragraph no. 4 of the present Office action that that terminal disclaimer has been **accepted**. Applicant also submits that the claims of US 6,583,208 B1 clearly differ from those of the present application, and that the present claims do not represent statutory double patenting over US ‘208.

As discussed above, Applicant’s agent, Daniel Geselowitz, telephoned Examiner Ronesi on April 25, 2005, for clarification of this rejection. The Examiner indicated that she expected us to address possible rejections under 35 U.S.C. 103(a)/102(e), (f) or (g), for this reference.

U.S. Patent Application Serial No. 09/806,485
Amendment filed August 2, 2005
Reply to OA dated April 4, 2005

However, Applicant respectfully submits that as noted above, Suzuki '208 is **not** prior art under 35 U.S.C. (e). Suzuki '208 is also clearly not prior art under 35 U.S.C. 102(f), since Suzuki, the sole inventor of US '208, is an inventor of the present application. Suzuki '208 is also not prior art under 35 U.S.C. 102(g).

In Applicant's telephone call to Examiner Ronesi, she implied that she considered "Suzuki" in US '208 to be a different inventive entity than Suzuki et al. in the present application, and therefore considered 35 U.S.C. 102(e) to apply. Applicant respectfully submits that this is not correct. The Examiner may be referring to the text of MPEP 706.02(a)(II)(B) that "only one inventor need be different for the inventive entities to be different ..." However, this wording does not refer to the present situation (but rather appears to refer to the situation discussed in MPEP 706.10). It is **logically impossible for Suzuki to have filed the application for US '208 before he invented the material disclosed in US '208**. Since Suzuki is one of the present inventors, the date Suzuki invented this material would be the same as the date that the present inventors (Suzuki et al.) invented this material.

Applicant notes the discussion in MPEP 716.10, where it explains that the situation of "a patent application filed jointly by **S and another, is claimed in a later application filed by S**", can be overcome by showing that S alone conceived or invented the subject matter disclosed in the patent or published application. In the present case, there is no need for any declaration regarding inventorship in the cited reference, since there is only one inventor in Suzuki US '208.

U.S. Patent Application Serial No. **09/806,485**
Amendment filed August 2, 2005
Reply to OA dated April 4, 2005

To summarize, Suzuki US '208 is **not prior art** under 35 U.S.C. 102(e), (f) or (g) (or any other section of 35 U.S.C. 102). Therefore, the statement requested by the Examiner in paragraph no. 4 of this Office action, which is relevant to 35 U.S.C. 103(c), is unnecessary.

Withdrawal of the rejection is respectfully requested.


If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicant's undersigned agent at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

U.S. Patent Application Serial No. **09/806,485**
Amendment filed August 2, 2005
Reply to OA dated April 4, 2005

In the event that this paper is not timely filed, Applicant respectfully petitions for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

ARMSTRONG, KRATZ, QUINTOS,
HANSON & BROOKS, LLP



Daniel A. Geselowitz, Ph.D.
Agent for Applicants
Reg. No. 42,573

DAG/lrj
Atty. Docket No. **010507**
Suite 1000
1725 K Street, N.W.
Washington, D.C. 20006
(202) 659-2930



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PATENT TRADEMARK OFFICE

Enclosure: Declaration under §1.132 by Noriyuki SUZUKI



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of : Noriyuki SUZUKI et al.

Serial No.: 09/806,485

Filed: September 24, 2001

For: RESIN COMPOSITION CONTAINING SILANE-TREATED FOLIATED
PHYLLOSILICATE AND PROCESS FOR PRODUCING THE SAME

DECLARATION UNDER 37 CFR 1.132

Honorable Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

I, Noriyuki SUZUKI, residing 1-2-54, Koyodai, Kawanishi-shi,
Hyogo, Japan declare as follows:

1. I Noriyuki SUZUKI, have following postal address:
c/o KANEKA CORPORATION, Research Institute, Osaka Research
Laboratories at 1-1, Torikai-Nishi 5-chome, Settsu-shi,
Osaka, Japan.
2. I graduated from Department of Synthetic Chemistry,
Faculty of Engineering Science, Osaka University, Japan, in
the year, 1987.
3. I have been employed by KANEKA CORPORATION since 1987.
I have been engaged in development for new polymer materials
in the field of engineering plastics such as polyarylate,
polyamide, polycarbonate and polyester. I am one of the
inventors of the above-identified application (hereinafter
referred to as "the present application"), and I am fully
familiar with the invention of the present application
(hereinafter referred to as "the present invention").

4. I have reviewed the Official Action dated April 4, 2005, issued for the present application (hereinafter referred to as "the Official Action"). I understand that WO 97/43343 and Japanese Laid-open Patent Publication 09-328538 (hereinafter referred to as "JP 9-328538") were cited in the Official Action. I am also one of the inventors of WO 97/43343, and I am fully familiar with the subject matter thereof. Therefore, I am fully familiar with the difference between the present invention and the subject matter of WO 97/43343.

5. According to the present invention, when a clay dispersion and a polymerizable prepolymer is mixed, the clay dispersion is added to a polymerizable prepolymer continuously or sequentially over time at the rate of 0.01 to 10.0 parts by weight per minute for 100 parts by weight of the polymerizable prepolymer.

Since the clay dispersion is added to a polymerizable prepolymer continuously or sequentially over time at the rate of 0.01 to 10.0 parts by weight per minute, the ingredients in the resulting mixture are highly homogenous and a sufficient interaction between the ingredients is achieved, such that the mixture has at least one of the following rheologic properties (i) to (iii) defined in claim 1 of the present application:

- (i) $(\eta_e - 3\eta)$ is 300 Pa·s or more;
- (ii) $(\Delta\eta_e)$ is 500 Pa·s or more; and
- (iii) $J_{e0}\eta_0$ is 0.8 seconds or more.

Since the resin composition of the present invention has at least one of the aforementioned rheologic properties (i) to (iii), the resin composition can achieve the satisfactory

effects demonstrated in the Examples in the specification of the present application.

6. On the other hand, if the clay dispersion is not added to a polymerizable prepolymer continuously or sequentially over time, then a resulting mixture is not so highly homogenous as to provide the aforementioned rheologic properties (i) to (iii). Therefore, it is impossible to achieve the satisfactory effects.

7. WO 97/43343 does not describe a method of "adding clay dispersion to a polymerizable prepolymer continuously or sequentially over time at the rate of 0.01 to 10.0 parts by weight per minute for 100 parts by weight of the polymerizable prepolymer". Therefore, according to WO 97/43343, it is impossible to obtain a composition having at least one of the aforementioned rheologic properties (i) to (iii).

8. Based on our experience with the subject matter of the above-identified application, the following experiments were conducted to demonstrate that the composition described in WO 97/43343 have none of the aforementioned rheologic properties (i) to (iii).

Production Example 1:

In accordance with the method described in Production Example 1 of WO 97/43343, silane-treated foliated phyllosilicate and slurry were obtained.

Specifically, montmorillonite, 150 g, was dispersed in 6800 g of pure water by agitating at 5000 rpm for three minutes using a high-seed agitator. Thereafter, 15 g of γ -(2-aminoethyl)aminopropyltrimethoxysilane was dropped in using a pipette, and the resultant mixture was agitated at a revolution of 6000 rpm for two hours, to obtain a slurry

(slurry a) composed of a silane-treated foliated phyllosilicate and water.

A portion of the slurry was dried and pulverized to obtain a silane-treated foliated phyllosilicate (silane-treated foliated phyllosilicate a). The resultant silane-treated foliated phyllosilicate had a basal spacing of 2.6 nm. The silane-treated foliated phyllosilicate was washed with THF and then measured by FT-IR. As a result, absorption bands originating from a primary amino group, a secondary amino group, and an ethylene group were observed.

The silane-treated foliated phyllosilicate and the slurry obtained in Production Example 1 are referred to as "silane-treated foliated phyllosilicate a" and "slurry a", respectively.

Example 1:

Slurry a, 400 g, produced in Production Example 1 and 3000 g of bishydroxyethyl terephthalate (hereinbelow, referred to as BHET) were put in an autoclave provided with a distilling tube and mixed, and agitated at a temperature of about 120°C for about three hours. While being further agitated for about one hour, the mixture was decompressed to remove water, so as to prepare a BHET slurry (containing a minute amount of water) essentially composed of silane-treated foliated phyllosilicate a and BHET.

Thereafter, 7.5 g of a hindered phenol stabilizer (AO60 manufactured by Asahi Denka Kogyo K.K.; hereinbelow, referred to as AO60) and 0.45 of antimony trioxide (Sb_2O_3 ; hereinbelow, referred to as Sb_2O_3) as polymerization catalyst were added to the slurry, to polymerize BHET at a polymerization reaction temperature of 280°C under decompression, thereby to produce polyethylene terephthalate (PET). Thus, a thermoplastic polyester resin composition

containing silane-treated foliated phyllosilicate a was produced. The logarithmic viscosity of the PET in the thermoplastic polyester resin composition was 0.59 (dl/g).

Measurement of Equilibrium compliance J_{e0} and zero shear viscosity η_0 :

Regarding the thermoplastic composition obtained by the method described above, Equilibrium compliance J_{e0} and zero shear viscosity η_0 were measured, as described below:

The polyester resin composition was molded by thermopressing under the conditions of a temperature of 280°C, and a pressure of $4.9 \times 10^6 \text{ N/m}^2$, thereby obtaining a sheet with a thickness of 1.4 mm. A disc having a diameter of 25 mm was cut out from the obtained sheet and served as the sample for measurement.

Next, using a fusion viscoelasticity measurement apparatus of stress control type (Rheometric Scientific, DSR-200), the above-described sample was sandwiched between the cone and plate, and melted at 280°C under nitrogen atmosphere. Thereafter the sample was held still for 5000 seconds, and then twisted in a clockwise direction with a constant stress of 50 N/m². The creep compliance was measured at 280°C.

The creep compliance $J(t)$ measured as described above was represented by the equation (1):

$$J(t) = \gamma(t) / \sigma \quad (1).$$

The creep curve of the creep compliance $J(t)$ was then approximated by a straight line as in the equation (13):

$$J(t) = J_{e0} + t / \eta_0 \quad (2).$$

From the intercept of the straight line, the equilibrium compliance J_{e0} was calculated, and from the gradient of the straight line, the zero shear viscosity η_0 was calculated.

(Extensional viscosity η_e and shear viscosity η)

Using a twin capillary rheometer configured by arranging two capillary rheometers (manufactured by Rosand Precision), a die having an $L_1=16$ mm and $D_1=1$ mm (referred to as a long die) and a die having an $L_2=0.25$ mm and $D_2=1$ mm (referred to as a short die) are attached, respectively, to each of the capillary rheometers. The barrels and the dies are set at 280°C and the same amount of the polyester resin composition was supplied to each of them and fused. The fused polyester resin composition was then extruded simultaneously, and the values of the pressure loss p_1 and p_2 were measured at a shear rate within the range of 20 to 200 (1/s). From the obtained values of the pressure loss, the pressure loss p_0 of a virtual die with a length of 0 was calculated using the equation (3):

$$p_0 = (p_2 \cdot L_1 - p_1 \cdot L_2) / (L_1 - L_2) \quad (3)$$

where p_1 is the pressure loss measured with the long die, p_2 is a pressure loss measured with the short die, L_1 is the length of the long die, and L_2 is the length of the short die.

The extensional viscosity η_e and rate of strain $\dot{\epsilon}$ are calculated by the equation (4) and (5), respectively:

$$\eta_e = [9(n+1)^2 p_0^2] / 32 \eta \dot{\gamma}^2 \quad (4)$$

$$\dot{\epsilon} = 4 \eta \dot{\gamma}^2 / 3(n+1) p_0 \quad (5),$$

where $\dot{\gamma}$ is the shear rate and η is the shear viscosity. n is the power-law index, which is defined by the equation (6):

$$\eta = c \dot{\gamma}^{n-1} \quad (6)$$

where c is a constant.

The relationship between the shear rate and the shear viscosity is approximated by the equation (7):

$$\eta = a \dot{\gamma}^p \quad (7),$$

using the least-squares method, thereby obtaining a and p . The relationship between the rate of strain and the extensional viscosity was approximated by the equation (8):

$$\eta_e = b \dot{\epsilon}^q \quad (8),$$

using the least-squares method, thereby calculating b and q .

The difference $(\eta_e - 3\eta)$ between η_e at $\dot{\epsilon} = 100$ (1/s) and 3η at $\dot{\gamma} = 100$ (1/s) is the index of the strain hardening property according to the present invention. Specifically, it was calculated by

$$(\eta_e - 3\eta) = b \cdot 100^q - 3a \cdot 100^p \quad (9).$$

(Results)

The results were as follows:

$$(\eta_e - 3\eta) = 290 \text{ Pa}\cdot\text{s}$$

$$\Delta\eta_e = 449 \text{ Pa}\cdot\text{s}$$

$$J_{e0}\eta_0 = 0.71 \text{ sec.}$$

From the above results, it is understood that the composition of WO 97/43343 does not have the aforementioned rheologic properties (i) to (iii).

9. As explained in page 3, 3rd line from the bottom to page 4, line 1 of the Official Action, WO 97/43343 describes that the polymerizable prepolymer and the clay dispersion are mixed by combining the ingredients all at once. WO 97/43343 describes that "The monomer can then be added to the dispersion and sufficiently agitated to obtain a mixture" (page 23, lines 8-9 of WO 97/43343; column 14,

lines 63-64 of US Patent No. 6,239,195). That is, WO 97/43343 describes that the monomer should be added to the dispersion. In other words, the dispersion is added to the monomer at once.

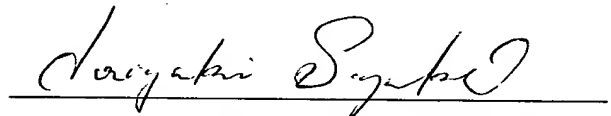
Therefore, WO 97/43343 does not disclose or suggest a method of "adding the clay dispersion to a polymerizable prepolymer continuously or sequentially over time at the rate of 0.01 to 10.0 parts by weight per minute for 100 parts by weight of the polymerizable prepolymer".

10. I have reviewed JP 9-328538 and I believe that JP 9-328538 is irrelevant to the patentability of the present invention. JP 9-328538 discloses a method of manufacturing a polyester containing microparticles. Claim 1 of JP 9-328538 describes a method comprising the steps of: delivering a slurry continuously to an esterification reaction chamber; and performing an esterifying reaction. Paragraph 0021 describes that (1) ethylene glycol was added to an aqueous dispersion containing colloidal silica; (2) a terephthalic acid was added thereto so that a slurry was prepared; (3) the slurry was continuously delivered to an esterifying chamber; and (4) an esterifying reaction was performed.

That is, JP 9-328538 merely describes that the prepolymers are added to the silica dispersion. JP 9-328538 does not describe that the silica dispersion is added to the prepolymers. JP 9-328538 does not describe or suggest a method of "adding the clay dispersion to a polymerizable prepolymer continuously or sequentially over time for 100 parts by weight of the polymerizable prepolymer".

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Executed on July 27th, 2005.


(Noriyuki SUZUKI)